(19) World Intellectual Property Organization

International Bureau





(43) International Publication Date 10 November 2005 (10.11.2005)

(10) International Publication Number WO 2005/105944 A1

(51) International Patent Classification7: H01L 31/0296, 31/032, B05D 5/00

C09K 3/00,

TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,

(21) International Application Number:

PCT/US2004/010415

2 April 2004 (02.04.2004) (22) International Filing Date:

(25) Filing Language:

English

(26) Publication Language:

English

- (71) Applicant (for all designated States except US): MID-WEST RESEARCH INSTITUTE [US/US]; 425 Volker Boulevard, Kansas City, MO 64110 (US).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): BHATTACHARYA, Raghu, N. [US/US]; 5573 South Taft Street, Littleton, CO 80127 (US).
- (74) Agents: WHITE, Paul, J. et al.; National Renewable Energy Laboratory, 1617 Cole Boulevard, Golden, CO 80401
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR,

GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- as to the identity of the inventor (Rule 4.17(i)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)
- of inventorship (Rule 4.17(iv)) for US only

Published:

with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: ZnS/Zn(O, OH)S-BASED BUFFER LAYER DEPOSITION FOR SOLAR CELLS

(57) Abstract: The invention provides CBD ZnS/Zn(O,OH)S and spray deposited ZnS/Zn(O,OH)S buffer layers prepared from a solution of zinc salt, thiourea and ammonium hydroxide dissolved in a non-aqueous/aqueous solvent mixture or in 100% non-aqueous solvent. Non-aqueous solvents useful in the invention include methanol, isopropanol and triethyl-amine. One-step deposition procedures are described for CIS, CIGS and other solar cell devices.

